Briefly summing up the above, the drought of 1913, which began in May over central and southern Illinois, continued to grow worse until the third decade of June, when it was somewhat relieved by generous rains in some sections but continuing in other sections until the fore part of August, when beneficial rains fell in many localities, while in still others it continued almost unabated until the middle of September. During the latter part of September good rains appear to have completely broken the drought in almost every section of the State.

The following statement, which shows in percentage the extent to which the drought and heat wave damaged the staple crops of the State, has been assembled from estimates received from cooperative observers on September 24: Corn damaged, 44 per cent; wheat damaged, 4 per cent; oats damaged, 61 per cent; hay damaged, 39 per cent; apples damaged, 32 per cent; pears damaged, 26 per cent; peaches damaged, 21 per cent; potatoes damaged, 65 per cent; sweet potatoes damaged, 58 per cent; Tomatoes damaged, 52 per cent; beans damaged, 54 per cent.

DROUGHT AND HEAT WAVE OF 1913 IN INDIANA.

By VERNE H. CHURCH, Section Director.

The drought and heat wave which prevailed over many States in the Middle West, and was noteworthy for its length and severity, extended into Indiana from the southwest and covered from one-third to two-fifths of the State. The extreme southwestern counties and a narrow strip along the west side of the State as far north as Terre Haute suffered the most severely, because of a deficiency of moisture as early as the month of April, whereas the remainder of the drought area received more than the normal amount of precipitation in April, thereby shortening the dry season in those sections by a month or more, and affording ample moisture at a time when it was most essential for the germination of spring crops. Some of the stations farther east and north received an excess of rain in July and August, which practically terminated or at least greatly relieved the droughty conditions in those districts.

The rainfall during the months of April to August, inclusive, consisted mainly of local showers. These occurred in many cases over comparatively small areas, causing the line of demarcation between dry and moist areas to be sharply drawn. Prof. E. E. Ramsey, cooperative observer at Bloomington, says:

> The rains have been local in an abnormal degree. Distances of 200 feet are sufficient to separate areas of good showers from areas receiving no rain. The east side of Monroe County has had rain sufficient for all purposes during the entire summer. In this narrow belt, which extends into Brown County, the crops are above average.

Many of the local showers were extremely heavy, which materially lessened the deficiency in rainfall but failed to benefit crops in proportion to the measured quantity which fell, because of excessive run-off and diminished absorption due to the unusual density and hardness of the soil.

From April to August, inclusive, the deficiency in precipitation over the drought area ranged from 3 to slightly more than 10 inches. The portions of the State where the deficiency was less than 3 inches suffered little more during the driest periods than in the average summer season. In the driest districts, however, the drought was said to have been the severest since 1881, which was prior to the establishment of a cooperative meteorological service, hence no records for that year are available for comparison.

The destructiveness of the drought was greatly augmented by the prevalence of unseasonably hot weather from about the middle of June to the latter part of August. The mean temperature for the State was above normal for each of the months under discussion, and the temperatures at individual stations universally exceeded the seasonal average during June, July, and August. The hottest period of the summer prevailed from June 15 to July 5, inclusive. During this time maximum temperatures of 90° or above were recorded on practically every day at nearly all stations, and temperatures of 100° or above were reached at most stations in the drought district on one or more days.

Probably the hottest previous summer on record was was that of 1901. However, the conditions were very different in that year. April and May, 1901, were deficient in temperature, whereas in 1913 there was a slight excess; June experienced practically the same temperature in the two years; July, 1901, was extremely hot, while August of that year was cooler than August, 1913. Therefore the hot summer of 1901 can be attributed chiefly to the abnormally hot weather in July of that year. The hot weather of that summer was more uniformly distributed over the State. In that year there were 13 stations with an average of 7 more days with a temperature of 90°, or above, than in 1913. Those stations were all in the north half of the State, except two. The two in the southern half had an excess of only one day each. On the other hand, there were 21 stations having an average of 14 more days with like temperatures in 1913 than in 1901, these stations all being situated in the southern half and extreme western part of the northern half of the State. Therefore it may be stated that the portion of the State under discussion experienced a hotter summer, as a whole, in the current year than in any other year for which records are available.

Hot winds also played an important part in increasing the intensity of the drought, especially during the hot spell in June, and damage to fruit from this cause was also observed in August. Reports have also been received of the loss of some fruit and forest trees from the same cause. In the vicinity of Mount Vernon, where 600,000 pounds of pecans were grown last year, the report is current that the crop is an entire failure this year.

Reports from various sources indicate that the damage to the wheat crop by drought was almost negligible, but all other crops suffered severely. Oats in most cases were too short and too light to be cut with a binder. Hay was extremely short and light. Early potatoes were a complete failure, and late potatoes give promise of only a very light crop. The tobacco crop is very light, and gardens were mostly failures. The tomato crop will not exceed 50 per cent of a normal yield. Corn suffered severely, but will be a better crop than any of the others except wheat, especially on bottom lands.

The water supply was greatly affected. Many wells and small streams became dry, and farmers were compelled to haul water considerable distances from rivers or other sources. A canning factory at Underwood and a power plant at Charlestown were kept in operation by hauling water from Jeffersonville in tank cars. The Baltimore & Ohio Southwestern Railroad Co. was compelled to run a water train from Jeffersonville for several weeks. Live stock suffered much from the scarcity of water, as it was necessary to haul water to them or drive them long distances. This extreme condition was confined to small localities however.

Because of the length of the heat wave, mankind suffered considerably, but the prevailing dry weather and consequent low percentage of humidity prevented an unusual number of heat prostrations. In fact, so far as can be learned, the number was less than in an average summer.

The droughty conditions extended up to about the middle of September, since which time general rains have materially improved pastures and ground under preparation for wheat seeding, but the moisture arrived too late to be of much value to crops.

Summarizing the information at hand, it is believed that, in the section of the State to which these remarks apply, the dry and hot weather of 1913 continued over a greater number of days than in any year in the history of the weather service of the State, with the possible exception of the summer of 1881, a year to which reference is made by several observers.